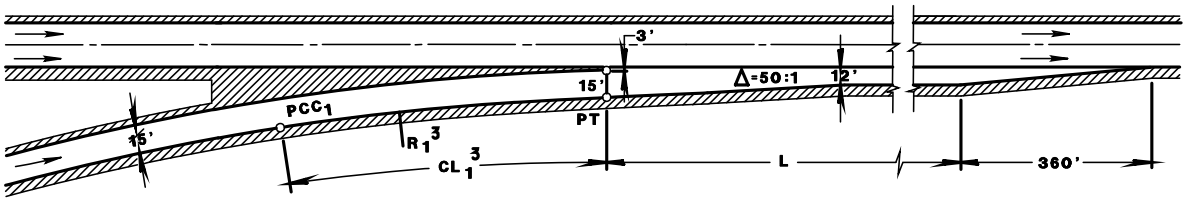


PARALLEL ENTRANCE RAMP

Entering Speed (Design Speed) of Ramp (mph)	Main Line Design Speed		Adjustment Factor for Upgrade on Mainline
	70 mph	55 mph to 65 mph	
	L feet	L feet	+2.2% to + 4% [1]
30	1350	1120	1.60
35	1230	1000	1.65
40	1000[1]	800	1.70
45	820[2]	600	1.75
50	600[2]	600	1.80
55	600[2]	600	1.85

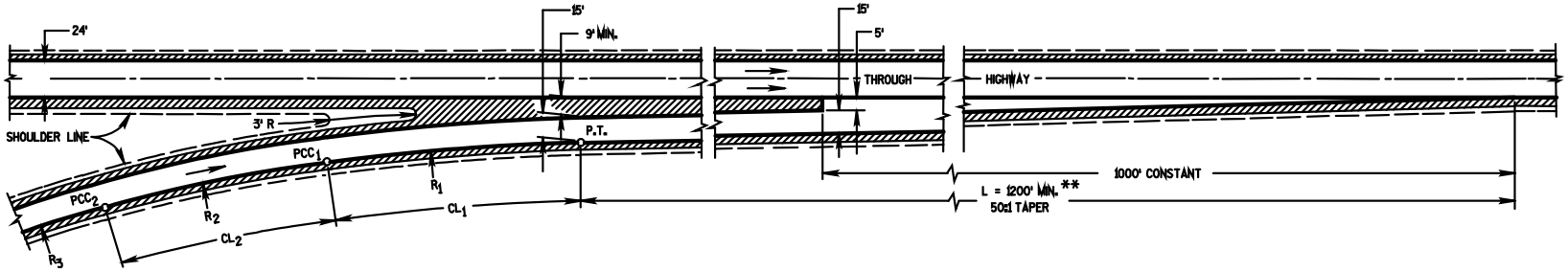
[1] For mainline upgrades less than +2.2 %, no adjustment is necessary. For mainline grades exceeding + 4%, see Exhibit 10-71 on page 852 of GDHS 2001. Also discuss this with your Project Oversight Engineer in the BPD Project Services Section.

[2] An acceleration lane length of a least 1200 feet, plus taper, is desirable whenever it is anticipated that the ramps and freeway will frequently carry traffic volumes approximately equal to the design capacity of the merging area (2001 AASHTO Page 853.)

[3]Ramp geometrics are adequate for mainline design speeds through 70 MPH. See Attachment 1.2 for R_1 and CL_1 Values.

Minimum Shoulder Treatments

Mainline
Left – 6' total / 3' paved [4' for interstate] (10' for 6 lane facility & greater.)
Right – 10' total / 8' paved (12' when the directional DHV for trucks exceeds 250)
Ramps
Left – 4' total / 3' paved
Right – 8' total / 5' paved



SINGLE LANE ENTRANCE TERMINAL

Ramp Design Speed PCC 2	Min. Radius			Curve Length	
(mph)	R_3	R_2	R_1	CL_2	CL_1
60	TANGENT ALIGNMENT		**Min. 1350'**		Min.200
55			**Min. 1095'**		Min.200
50			Min. 850'		Min.200
45	660'		850'		150'
40	510'		850'		150'
35	380'	660'	850'	150	150'
30	273'	510'	850'	150	150'
	*250'	* Minimum Desirable			

Minimum Shoulder Treatments

Mainline

Left - 6' total / 3' paved [4' for interstate] 10' for 6-lane facility & greater

Right - 10' total / 8' paved (12' when directional DHV for trucks exceeds 250)

Ramps

Left - 4' total / 3'paved

Right - 8'total / 5' paved

NOTES:

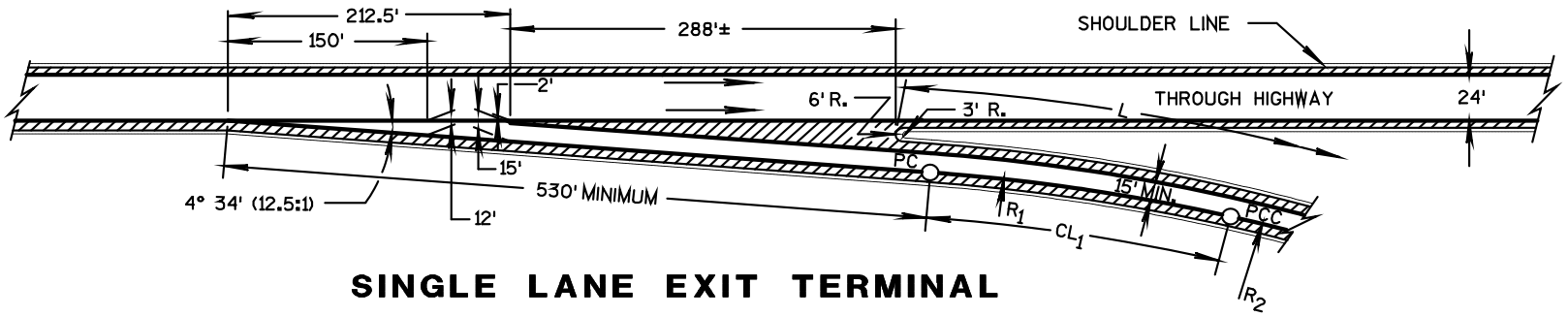
Ramp design speeds at PCC_2 are based on governing radii R_3 or R_1. Assuming SE = 6% refer to Exhibit 3-14 page 145, GDHS 2001.

Minimum acceleration lane, taper length (L), based on Exhibit 10-70, page 851 GDHS 2001.

For acceleration lanes having grades in excess of ±2% refer to Exhibit 10-71 page 852, GDHS 2001, for length adjustment.

**When design speed at PCC_2 is 40 MPH or less, adjust acceleration length (L) as follows: 1250' (40 MPH), 1300' (35 MPH), and 1400' (30 MPH) (50 km/h).

Ramp geometrics are adequate for mainline design speeds through 65 MPH.



SINGLE LANE EXIT TERMINAL

Ramp Design Speed PC	Min. Radius R_1	Min. Radius R_2	Ramp Design Speed PCC	Curve Length Min. CL_1
60 mph	1350’	850’	50 mph	200’
55 mph	1095’	660’	45 mph	200’
50 mph	850’	510’	40 mph	150’
45 mph	660’	380’	35 mph	150’
40 mph	510’	273’	30 mph	150’

L = 900’

LEGEND

Paved Shoulder

L Minimum ramp distance from gore to the intersection of the ramp with the crossroad.

R_2 Radius of the major internal segment of the loop.

NOTES:

The length of the deceleration lane is based on ramp grades of 0 to 2%. Refer to Exhibit 10-73 page 855 GDHS 2001, for length adjustment factors to be used when ramp grades exceed ± 2%.

If the ramp speed and radii relationships listed in the table cannot be attained due to area R/W restrictions, consideration should be given to collector-distributor roads.

The radii of the horizontal curves are rounded and based on a maximum superelevation rate of 6% and the speeds shown.

Ramp geometrics are adequate for mainline design speeds through 70 MPH.

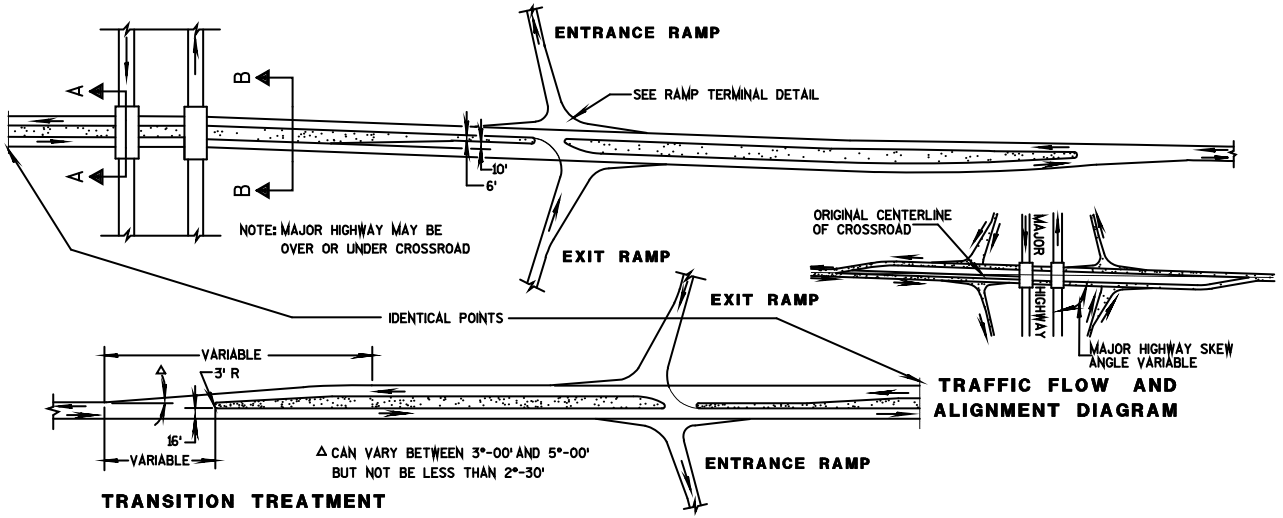
Minimum Shoulder Treatments

Mainline

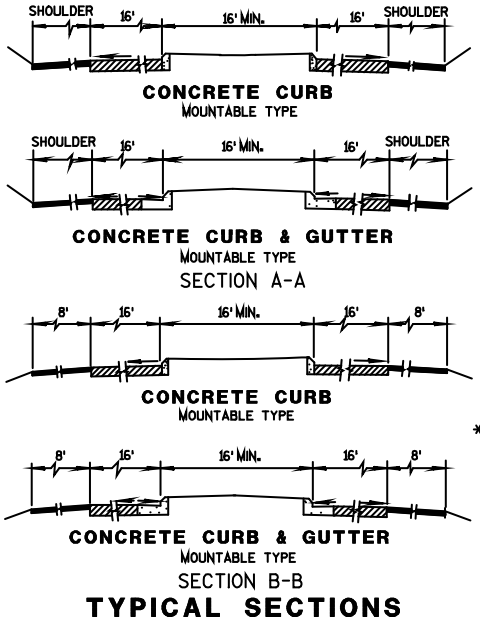
Left – 6’ total / 3’ paved [4’ for interstate] (10’ for 6 lane facility & greater.)
Right – 10’ total / 8’ paved (12’ when the directional DHV for trucks exceeds 250)

Ramps

Left - 4’ total / 3’ paved
Right - 8’ total / 5’ paved



TRANSITION TREATMENT



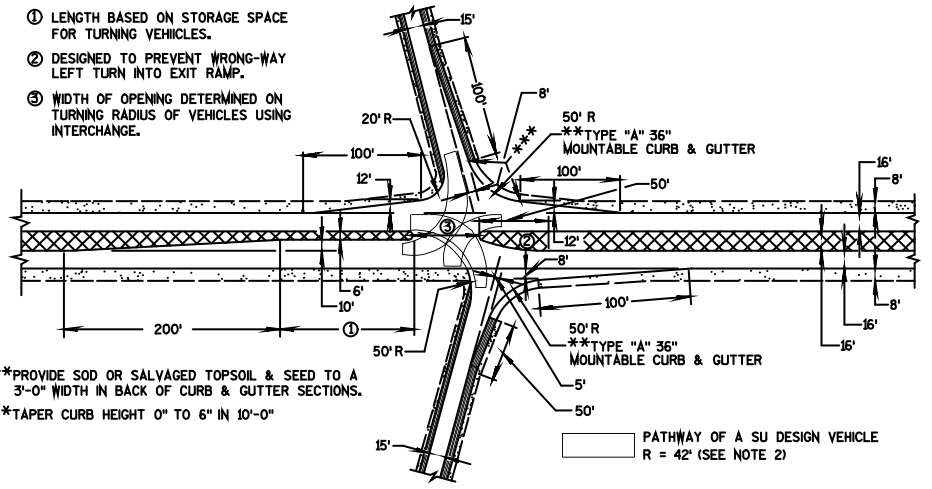
TYPICAL SECTIONS

NOTES:

① LENGTH BASED ON STORAGE SPACE FOR TURNING VEHICLES.

② DESIGNED TO PREVENT WRONG-WAY LEFT TURN INTO EXIT RAMP.

③ WIDTH OF OPENING DETERMINED ON TURNING RADIUS OF VEHICLES USING INTERCHANGE.



**PROVIDE SOD OR SALVAGED TOPSOIL & SEED TO A 3'-0" WIDTH IN BACK OF CURB & GUTTER SECTIONS.

***TAPER CURB HEIGHT 0" TO 6" IN 10'-0"

TYPICAL ENTRANCE AND EXIT RAMP TERMINAL DETAIL

PATHWAY OF A SU DESIGN VEHICLE R = 42' (SEE NOTE 2)

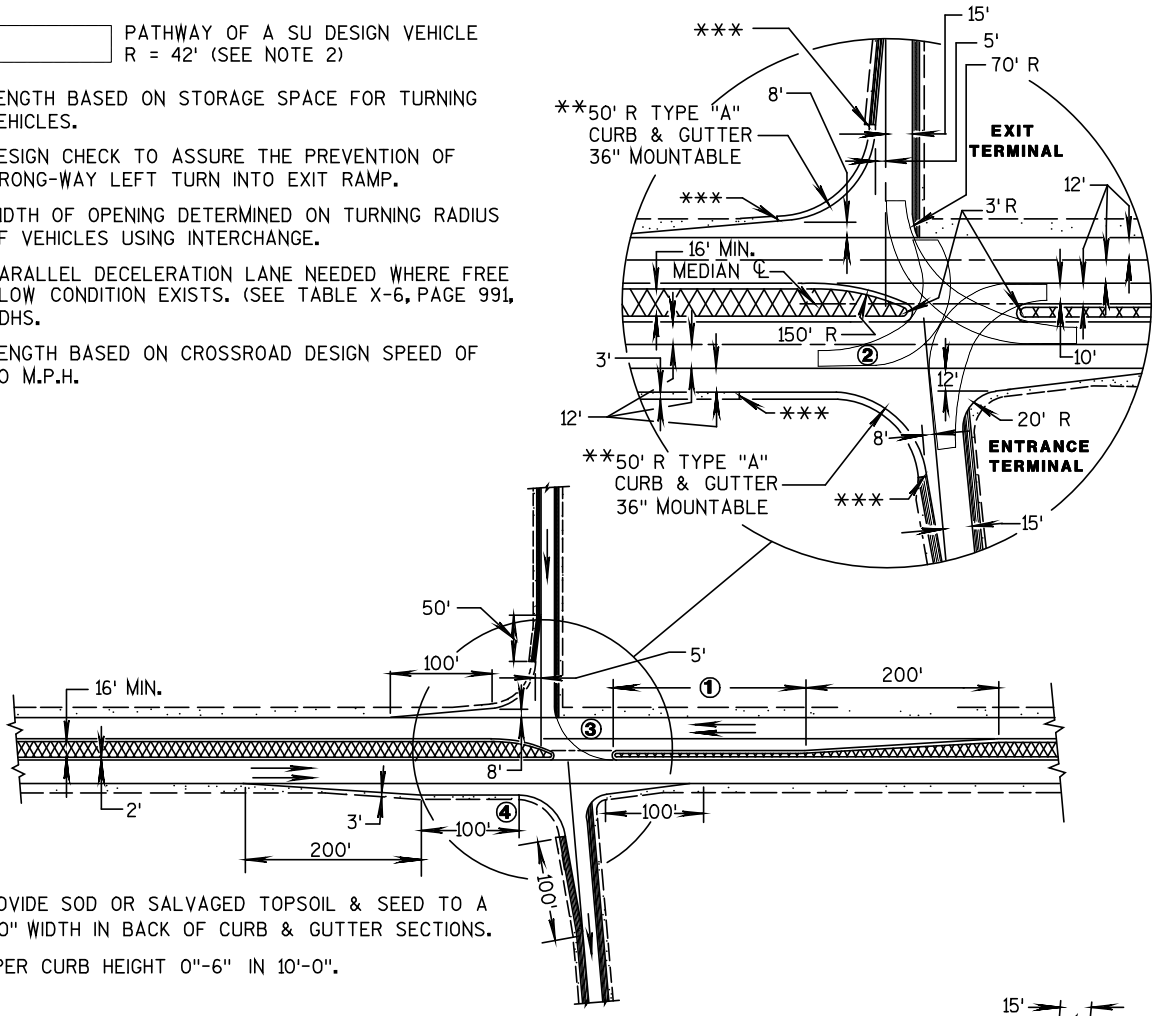
① LENGTH BASED ON STORAGE SPACE FOR TURNING VEHICLES.

② DESIGN CHECK TO ASSURE THE PREVENTION OF WRONG-WAY LEFT TURN INTO EXIT RAMP.

③ WIDTH OF OPENING DETERMINED ON TURNING RADIUS OF VEHICLES USING INTERCHANGE.

④ PARALLEL DECELERATION LANE NEEDED WHERE FREE FLOW CONDITION EXISTS. (SEE TABLE X-6, PAGE 991, GDHS.

⑤ LENGTH BASED ON CROSSROAD DESIGN SPEED OF 50 M.P.H.



** PROVIDE SOD OR SALVAGED TOPSOIL & SEED TO A 3'-0" WIDTH IN BACK OF CURB & GUTTER SECTIONS.

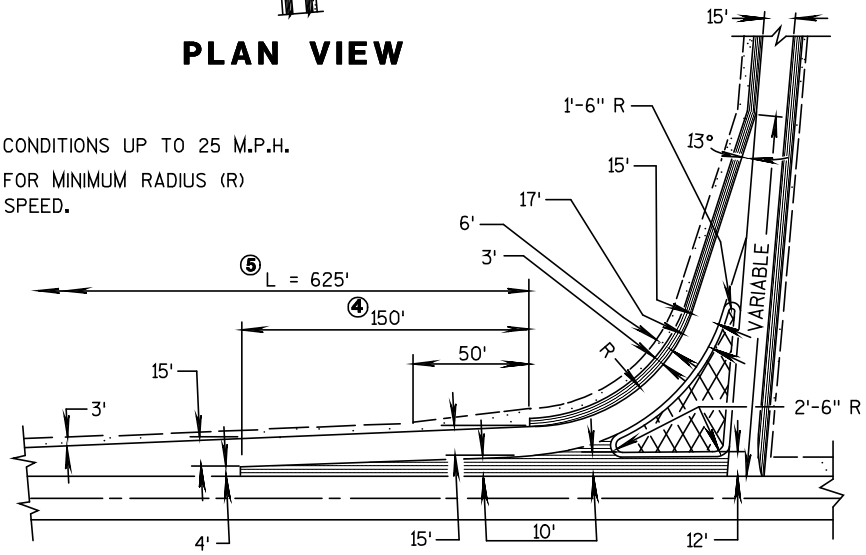
*** TAPER CURB HEIGHT 0"-6" IN 10'-0".

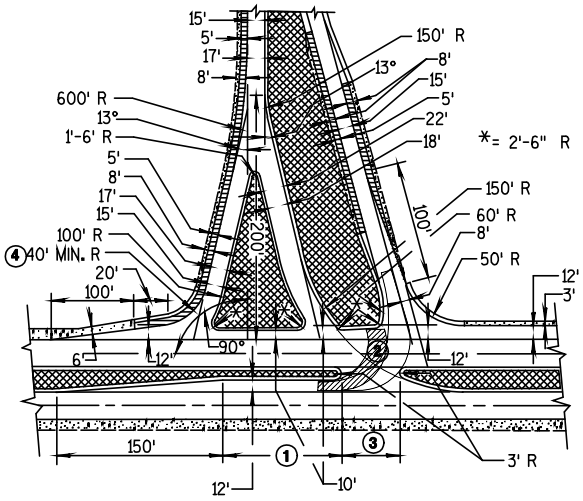
PLAN VIEW

NOTES:

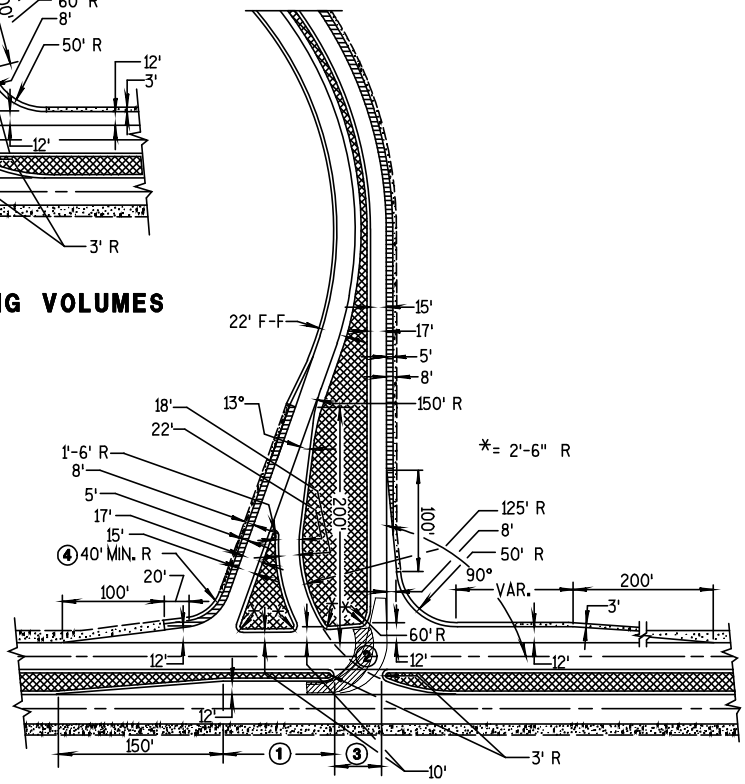
USE THIS DETAIL FOR FREE FLOW CONDITIONS UP TO 25 M.P.H.

SEE TABLE III-17, PAGE 197, GDHS FOR MINIMUM RADIUS (R) NECESSARY FOR DESIRED TURNING SPEED.



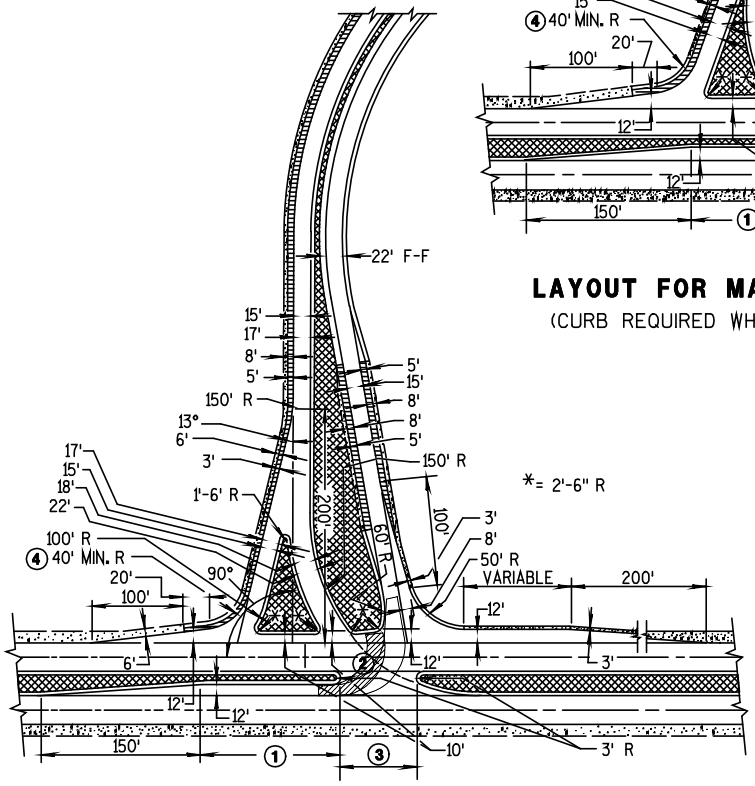


LAYOUT FOR EQUAL TURNING VOLUMES



LAYOUT FOR MAJOR RIGHT TURNING VOLUMES

(CURB REQUIRED WHEN RAMP RADIUS IS LESS THAN 430')



LAYOUT FOR MAJOR LEFT TURNING VOLUMES

(CURB REQUIRED WHEN RAMP RADIUS IS LESS THAN 430')

PAVED SHOULDER

UNPAVED SHOULDER

PATHWAY OF A SU DESIGN VEHICLE R=42' (SEE NOTE 2)

1. LENGTH BASED ON STORAGE SPACE FOR TURNING VEHICLES.
2. DESIGN CHECK TO ASSURE THE PREVENTION OF WRONG WAY LEFT TURN INTO EXIT RAMP.
3. WIDTH OF OPENING DETERMINED ON TURNING RADIUS OF VEHICLES USING INTERCHANGE.
4. VARIABLE DEPENDING ON THE AMOUNT OF FREE FLOW MOVEMENT DESIRED.

EITHER CURB OR CURB & GUTTER (MOUNTABLE OR BARRIER) MAY BE USED FOR THE ISLAND AND THE CROSSROAD MEDIAN.